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AUTHOR Useem, Elizabeth; And Others
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ABSTRACT

Among the best examples of the professional development of teachers that has become a key component of systemic educational reform are the curriculum-based teacher networks that have been created and nurtured in public schools by external private and public funders. This study examined the impact of four such networks on teacher renewal and systemic school reform in the school district of Philadelphia (Pennsylvania), the nation's fifth largest school district. The networks chosen were the largest, longest-lived, and most well-developed of Philadelphia's networks: (1) the Philadelphia Writing Project; (2) the Urban Mathematics Collaborative; (3) Science Resource Leaders; and (4) the World History Project (and its spinoff, Women in World History). Information came from document review, observation, interviews with 5 teachers from each network, and a survey completed by 193 teachers over all networks. Focus groups further explored the development and operation of these networks. Findings support the conclusions of other investigators that teacher-centered subject-area networks provide powerful learning experiences for their participants. Similarities and differences in the networks are traced. Seven tables (including graphs) present study findings. (Contains 33 references.) (SLD)

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Urban Teacher Curriculum Networks and Systemic Change

Elizabeth Useem
Philadelphia Education Fund

Judy Buchanan
Philadelphia Writing Project

Emily Meyers
Philadelphia Education Fund

Joanne Maule-Schmidt
Philadelphia Education Fund

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Philadelphia Education Fund
7 Benjamin Franklin Parkway
Suite 700
Philadelphia, Pennsylvania 19103
215-665-1400

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The professional development of teachers has become a key component of systemic educational reform efforts in the 1990s. The creation of school-based governance structures along with a coherent system of curriculum standards, assessments, and ongoing teacher education calls for the involvement and commitment of classroom teachers. Researchers generally agree that the most effective professional development efforts provide intensive experiences over a multi-year period enabling teachers to inquire, to learn and reflect on subject matter and pedagogy, to play leadership roles at many levels, to create collegial professional communities at school sites and broader educational contexts, and to become connected to a range of intellectual and community resources (Cochran-Smith and Lytle, 1993; Fullan, 1991; Little, 1993; McLaughlin and Talbert, 1993b; Miller, Lord, and Dorney, 1994; Renyi, 1994; Talbert and McLaughlin, 1994; Wasley, 1991).

Among the best examples of this sort of professional development are the curriculum-based teacher networks created and nurtured in public school districts over the last decade by external private and public funders. These networks, however, are vulnerable to criticism by practitioners that their support for individual teachers in settings removed from the workplace limits their impact on school-based change. We thus set out to look at the ways in which networks had tried to connect their work to reform at school sites. We also explored the degree to which the networks had or might become a part of the professional development infrastructure in systemic change initiatives in an urban district, providing the models, structure, and leadership linking systemic change visions to everyday practice in classrooms.

This study examined the impact of four such subject-area networks on teacher renewal and systemic school reform in the School District of Philadelphia, the nation's fifth largest school district (207,00 students). Our investigation looked at the impact of these district-wide teacher networks on teachers' individual professional growth, their classroom practices, and broader reform efforts in teaching and learning in schools. While identifying features common to all of the networks, we focused on variations among the networks in organization and effectiveness. We looked as well at the conditions enabling these groups to remain viable and the factors threatening their survival. A final issue emerged as the research was being conducted: how can teacher networks help implement the sweeping reform agenda ("Children Achieving") outlined by David W. Hornbeck, Philadelphia's newly-appointed Superintendent of Schools?[1]

Teacher Curriculum Networks: Background and Research

District-wide subject-area organizations and projects in multiple sites across the country have been created and funded over the last decade by national private foundations and the federal government. The most visible initiatives are: the local affiliates of the National Writing Project (NWP), launched initially in 1973 by the Bay Area Writing Project, and supported in part by federal education funds; the Ford Foundation-funded Urban Mathematics Collaboratives; the Rockefeller Foundation's CHART projects (Collaboratives for Humanities and Arts Teaching) and related curriculum efforts sponsored by the U.S. Department of Education; and the many networks spawned by the National Science Foundation in mathematics, science, and technology.[2]

Funding cycles for the networks typically lasted three to five years at the onset of the initiatives and all were characterized by a considerable degree of local control over project direction and activities. While an occasional site was based in a school district, in the great majority of cases, the programs were run out of universities, local education funds (non-profit school reform groups) or museums. These organizations were to be collaborative in nature, forming partnerships with the school district and other related groups

in the implementation of the work. The majority of the projects funded by these networks served children in urban areas or impoverished rural districts, the exception being the Writing Projects which are found in urban suburban, and rural areas. The networks concentrated on long-term teacher professional development and were not designed with the intention of undertaking profound structural changes in districts' operations.

The founders of these national projects shared similar perspectives about effective teacher professional development from the start of their work. They were committed to sustained, intensive professional development that included a broad range of activities: summer institutes (lasting as long as three to four weeks and followed up in subsequent summers), seminars, conferences, and retreats during the school year, leadership training, connections to local, regional, and national professional associations and reform groups, and technical assistance from consultants.

The belief that teachers themselves should play a major role in planning and running their own professional development has been a key feature of these networks' philosophies. They have generally stressed the importance of teacher inquiry, reflection, experimentation, and creation of innovative materials and pedagogies over a sustained period. The Writing Projects have articulated this perspective most clearly in their insistence that the source of much of the knowledge about the teaching of writing comes from teachers, that classroom change happens over a period of years as a result of professional development efforts occurring both on and off school sites, and that reform is best facilitated "by those who work in the schools, and not by transient consultants nor by packets of teacher-proof materials" (Gray, 1985, p. 64).

The assessments of the effectiveness of networks as vehicles for professional development have been consistently laudatory. Participating teachers credit the networks for contributing significantly to their professional growth, for deepening their content knowledge, and for changing their instructional practices (Aschbacher 1994; Heck, Webb, and Martin, 1994; LeMahieu and Sterling, 1991; Lieberman and McLaughlin, 1992; Little and McLaughlin, 1991; Maeroff, 1988; Webb and Romberg, 1994). Lieberman and McLaughlin (1992) argue that the strengths of subject-matter and other teacher-driven networks lie in their clear focus of activity around curriculum and instruction in a given subject area, their variety in programming and in opportunities for collegiality, their creation of "discourse communities" allowing teachers to "construct" their own learning, and their broad array of leadership opportunities.

Researchers have also noted the difficulties networks must contend with in trying to remain viable as organizations and in institutionalizing innovation in curriculum and instruction (Aschbacher, 1993; LeMahieu and Sterling, 1991; Lieberman and McLaughlin, 1992; Little and McLaughlin, 1991; Middleton and Webb, 1994). Individual or team network members can be perceived as elitist when they return to their school setting after intensive summer work, and network activities can divert teachers' energies away from school-based efforts. Networks have often been perceived as renewing individual teachers but having very little to do with change at the school level.

Funding to sustain operations once the initial grants end has been identified as a problem for all networks. Finding a way to be independent enough of a school district to control one's own network yet being close enough to ensure that network initiatives are supported by the bureaucracy, especially middle managers, is a serious dilemma requiring skilled negotiation. Issues common to many organizations intrude as well: developing a governance structure that balances democratic practices with efficient decision-making; managing growth with scarce resources; and evaluating the efficacy of programs in a way that helps redirect the network's goals.

The original idea guiding most of these teacher networks was to engage motivated individual teachers from across an entire district in rich professional development activities. However, the growing belief among evaluators and practitioners that an "individual socialization" model such as this was only weakly connected to school-wide change efforts has led to a shift of network development toward a "community building" model that intentionally ties professional development experiences with school-based reform. (See Talbert, 1995, for a review of the two models.) New (1994) federal legislation--Goals 2000 and the reauthorized Elementary and Secondary Education Act--also targets schools as the locus of teacher professional development with the intention of building more collegial school cultures focused on teaching and learning. As we examined the teacher networks in Philadelphia, we looked at the extent to which the teacher curriculum networks had redirected their recruitment and activities toward this new model.

Data and Methods

We chose the School District of Philadelphia as a site for this research for two reasons. First, three of the co-authors had worked with the teacher networks in that city and thus had detailed first-hand knowledge of their operations. Second, we set out to capture the experiences of these networks in a systemic investigation because our reading of national reports and evaluations led us to believe that Philadelphia had an unusually strong set of teacher curriculum networks. The work of Aschbacher (1994) for the Los Angeles Educational Partnership on three similar teacher networks provided a study we could replicate in order to have a comparative perspective from another large urban district.

Philadelphia has had as many as ten groups that might be classified as teacher curriculum networks in recent years.[3] They were networks in the sense that they met regularly, saw themselves as an identifiable group focused on curriculum and instruction in a particular subject area, had established methods of communication, and had one or more university partners. They all had received funding from the city's non-profit local education fund, formerly PATHS/PRISM, now rechristened as the Philadelphia Education Fund after its merger with the Philadelphia Schools Collaborative in 1995.[4] The four networks we chose to study were the largest, the longest-lived, and most well-developed of these groups. In three of the cases, the local Philadelphia project was one site in a national curriculum network. The networks chosen were the Philadelphia Writing Project, the Urban Mathematics Collaborative, Science Resource Leaders, and the World History Project along with its spin-off, Women in World History. All of these groups had a connection to PATHS/PRISM at some point in their development.

Our information came from several sources. Since three of the investigators are staff members at the Philadelphia Education Fund and the fourth is a Director of the Philadelphia Writing Project, we had first-hand knowledge of network activities and issues, and we could draw on archival sources of data about the networks. We augmented this information by querying teachers in the networks through interviews, surveys, and focus groups. Five teachers from each of the four networks who were identified by project directors as highly involved in the four organizations were interviewed in their schools for 30-60 minutes during December, 1994. The interview instrument was adapted from the survey questionnaire developed by Pamela Aschbacher at the Center for the Study of Evaluation at the University of California, Los Angeles, in 1993. The instrument, which has both closed-choice and open-ended items, was further refined for use as a mailed survey during the 20 interviews. All respondents who were contacted agreed to be interviewed. Since interviewees responded to approximately the same questionnaire as those who received it by mail, their responses were tallied along with the latter and their numbers are included in the overall survey response rate.

A questionnaire survey was mailed to all members of Science Resource Leaders (140), the History Projects (88), and members of the K-12 Math/Science Congress (59) (the surviving entity of the Urban Mathematics Collaborative) who had not been interviewed in early January, 1995.[5] Because Writing Project members had participated in other surveys, a sample of just 50 of its 285 participants (in addition to the five already interviewed) was selected to receive the survey. Although this sample was not randomly chosen, the Director selected participants so that the respondents represented all grade levels (K-12) and a range of involvement in the organization.[6] Response rates from the four groups ranged from a low of 50 percent of the History network teachers to a high of 60 percent of the Writing Project participants, with Science Resource Leaders (57 percent) and Math Congress members (52 percent) falling in the middle of the continuum. (Table 1) In all, we received and analyzed 193 surveys.

Table 1. Questionnaire Response Rates and Focus Group Participation, By Network

	Science Resource Leaders	Math/Sci Congress	History Projects	Writing Project
Percentage Responding*	57%	52%	50%	60%
Number of Respondents	80	33	47	33
Number in Focus Groups**	8	8	7	11

* Respondents also include those interviewed (5 per network) who were given the same questionnaire. All interview requests were granted.

** Focus groups were held separately for each network but on the same date.

We also conducted four two-hour focus groups with 7 to 11 teacher leaders per network in January, 1995. (Table 1) The format and questions for the focus groups were designed with the assistance of researchers from Research for Action, an independent evaluation firm. The views expressed in the focus groups augmented the interview and questionnaire data by providing deeper insights into the dynamics of networks as well as ideas about the ways in which networks could assist in Superintendent Hornbeck's reform initiatives. We believed the generation of ideas about future work would be stimulated in a group setting more than in individual interviews and questionnaires.

Descriptions of the Philadelphia Curriculum Networks

The Philadelphia Writing Project

The Philadelphia Writing Project (PhilWP) is one site of the National Writing Project, currently a network of 158 sites in 43 states. It is also an affiliate of the NWP's Urban Sites Network aimed at promoting teacher research and inquiry. Begun in 1986 with the assistance of PATHS/PRISM and as a partnership between the School District of Philadelphia and the University of Pennsylvania, the Writing Project developed a series of intensive summer institutes for teachers with follow-up activities during the school year

(Buchanan and Gelber, 1994; Cochran-Smith and Lytle, 1993). It has adhered to the basic tenets espoused by the National Writing Project: exemplary teacher professional development takes place over a long period of time assisted by the support of a university; teachers themselves should play the lead role in teaching other teachers; the study of the teaching of writing requires teachers from all grade levels to research and inquire together; and teachers in the project must themselves write (Gray, 1985).

Selected in a competitive process, teachers who complete the first in a multi-year sequence of three-week summer institutes become "teacher consultants," visiting the classrooms of other teachers during the school year. From 1986 until 1994, the School District funded six Writing Support substitute teachers whose service enabled the teacher consultants, now 285 in number, to conduct the cross-visitation (Lytle and Fecho, 1991). Other Writing Project activities include school-year workshops and conferences run in partnership with each of the six regional offices of the School District. Although the activities of the Writing Project such as these are carefully integrated with the work of the School District, the governance structure exists outside that system: the directors are a faculty member at the University of Pennsylvania and a teacher on release time from the District. Decisions are made by a Steering Committee chosen by the program participants. Funding, which has been remarkably stable over the years, comes from multiple external sources, including The Pew Charitable Trusts and the School District of PHiladelphia (through PATHS/PRISM). In addition to conferences and workshops, members stay in touch through a newsletter and other publications as well as an electronic mail network.

The World History Project/Women in World History Project

The history network studied here does not exist as a formal entity at present. There are, however, teachers who identify themselves as having been active members of the World History Project, a CHART site, or who are current participants in Women in World History, one of the spin-off initiatives of the World History Project. Officials at the Rockefeller Foundation originally conceived of the notion of arts and humanities centered interdisciplinary programs that were locally-based, teacher-driven, and developed in partnership with local cultural and educational institutions. At the request of Philadelphia's superintendent, Constance Clayton, PATHS/PRISM applied for and received funding from Rockefeller to rethink and rewrite the District's required 9th grade World History Curriculum. This project, lasting from 1988 to 1992, engaged approximately 80 secondary school history teachers from across the District in developing a two-year curriculum on global history.

The World History Project sought to create new curricular themes and materials from around the world, replacing the existing course's exclusively western focus. The curriculum was designed to enable students to become more active learners so that they might "think and act like historians," drawing on primary source documents and "hands-on" materials and connecting the themes with their own life experiences (Culbertson, 1993; LeMahieu and Sterling, 1991). When the project entered its implementation phase, however, it encountered opposition from other history teachers and department heads. And School District officials, although officially endorsing the project, did not energetically push for its institutionalization. As a result, the curriculum was adopted in a spotty and piecemeal fashion, and its expansion to a two-year sequence failed to materialize.

The influence of the World History Project, however, is still being felt. The curriculum or some of its units are being used in some high schools, the approach to history stressed in the program has been incorporated into curricula designed by high school charters (schools within-schools, begun in 1988), and several spin-off curriculum projects such as PATHS/PRISM's Women in World History Project have been created.[7] In addition,

several teachers active in the program went on to become key change agents in broader policy arenas.

The Women in World History Project (1992-95), funded by the U.S. Department of Education, has brought together university scholars with 27 secondary teachers of history and English and school librarians in a program of sequenced, directed research and curriculum design to integrate the study of women into secondary coursework, especially the World History course. Considerable overlap exists with the World History Project through team participants, advisers, and guiding philosophy. The structure and activities of the Women in World History Project, however, have explicitly addressed the issue of school implementation by selecting teachers in eight interdisciplinary school teams (each of which had to include a librarian) and by including funds for staff development activities and materials acquisition at the eight school sites. The teacher research and inquiry methods of the Philadelphia Writing Project have also been introduced to this work. Both the World History and Women in World History projects have operated with relative independence from the School District but have received significant assistance from the District's Office of Curriculum Support.

The Urban Mathematics Collaborative

The Philadelphia site of the Urban Mathematics Collaboratives (16 in all nationally) is still an active entity in the form of the K-12 Math/Science Leadership Congress even though the five-year Ford Foundation grant ended in 1990. The Collaboratives were established by Ford to upgrade mathematics curriculum and pedagogy in urban areas and to support teachers' professional growth through a rich array of professional development activities, including opportunities for leadership training. The Philadelphia Collaborative was originally designed and housed at the Franklin Institute (the city's science museum) but its institutional base moved to PATHS/PRISM from 1989 to 1994 and then to Temple University. By the 1990-91 school year, the Collaborative was actively involved in professional development in 23 high schools in the District, working closely with mathematics and science department heads (Kantrov, 1990; Webb *et al.*, 1991).

When Ford funding ended in 1990, the teachers themselves took the initiative in subsequent years to continue the work. With the support of PATHS/PRISM, they raised money from other sources to run an extensive program of leadership training and curriculum workshops for several hundred teachers and to publish a teacher journal (Heck, Webb, and Martin, 1994). They also reorganized themselves into a K-12 organization, the K-12 Math/Science Leadership Congress, that included both mathematics and science teachers. The 65 Congress members, coordinated by an Executive Committee, oversee the activities of the network. The Congress continues to engage in grant-writing efforts and meets regularly to stay abreast of national and local curriculum reform efforts. Its membership overlaps with other networks, including Project 2061 (science benchmarks) and the NSF-funded Interactive Mathematics Project. Although Congress activities often intersect with District initiatives, the Congress seeks to maintain its independence from School District control.

Science Resource Leaders

The design of the NSF-funded Science Resource Leaders (SRL), the fourth of the networks studied, was explicitly tied to systemic change efforts in science curricula and pedagogy. The three-year project (1992-95), co-administered with PATHS/PRISM and the School District of Philadelphia, resulted from the ideas and impetus of teacher participants in an earlier multi-year NSF project ("Experiencing Light, Heat, and Motion").[8] The goal of the project has been to train a team of two teachers in all schools with middle grades to plan and coordinate schoolwide science staff development and to assist in bringing science resources to the school. Since a great many middle grades teachers assigned to science

courses were certified only at the elementary level and had little or no prior training in the subject, the project enrolled its 140 teachers in three 120 hour institutes in science content and pedagogy, including work on research projects. Teams also carried out annual school-based projects, participated in retreats, and attended support meetings and conferences.

SRL training and activities have been closely connected to work in standards and assessments being conducted nationally. The School District has called on SRLS to assist in the dissemination of the Project 2061 benchmarks and to serve on district task forces on science standards and assessments. SRLs are expected to participate in staff development efforts funded by the NSF Urban Systemic Initiative (USI) grant to Philadelphia for the period 1995-1999. The project has linked teachers with local affiliates of professional associations and the K-12 Math/Science Leadership Congress. A monthly newsletter has provided a regular communication link among participants. The project, however, lacks an independent teacher-governance mechanism. As SRL winds down and its work joins with the USI initiatives operating from the District's central office, new roles for teachers in designing and directing its activities will need to be negotiated.

Findings

Teachers varied by network in their grade level, current position, proportion female, and years of teaching. (Table 2) Nearly all of the history network respondents were secondary teachers (95.7 percent) and the majority of Science Resource Leaders were concentrated in the middle grades (65.4 percent) since the two projects were targeted at those respective groups. Nearly half of the math network teachers were secondary school teachers (48.5 percent) with the rest somewhat evenly divided between the elementary and middle school levels. Among the Writing Project respondents, 42.4 percent were elementary teachers with a third (33.3 percent) working in high schools and the rest assigned to the middle grades. The percentage of respondents currently holding positions in the District outside of the classroom ranged from 12.1% of the math respondents to 27.7% of the history respoondents. A significant proportion of the history respondents had become department heads or charter coordinators (14.9 percent) or had assumed another non-teaching position (12.8 percent).

Table 2. Background Characteristics of Respondents

	Science Resource Leaders (N=80)	Math/Sci Congress (N=33)	History Projects (N=47)	Writing Project (N=33)
Grade/School Level*				
Elementary	27.2%	27.3%	0.0%	42.4%
Middle (6 to 8)	65.4	21.2	0.0	15.2
High School	6.2	48.5	95.7	33.3
% in Non-Teaching Positions	13.6	12.1	27.7	21.2
Proportion Female	82.7	69.7	70.2	81.8
Years of Experience (median)	16.0	23.5	24.5	21.0

* Refers to grade levels that respondents are teaching or, in the case of non-teaching personnel, their school level. Percentages omit non-respondents, non-school personnel, and those teaching across all middle school and elementary grades.

The networks with higher percentages of elementary and middle grades teachers had more females in their ranks. More than four fifths of the SRLs and Writing Project teachers responding to the survey were female, whereas a little more than two-thirds of the history and math network respondents were female. The majority of the history, math, and Writing Project teachers had been teaching for more than 20 years (the median number of years ranged from 21 to 24.5). The SRLS, however, were somewhat less experienced, with a median of 16 years in the classroom. This makes sense given that their assignment to teach science, a subject for which few of the District's middle grades teachers volunteer, often reflected their lower seniority.

Network Impact on Teachers' Individual Professional Growth

Overall, the teachers included in this study were extremely positive in their appraisals of their experiences in the curriculum networks, a finding which parallels previous studies of networks. They spoke and wrote movingly about the ways in which these professional development experiences had created collegial communities, enhanced their subject matter knowledge in intellectually stimulating ways, expanded their repertoire of instructional strategies, facilitated access to new materials and resources, validated their philosophies and teaching practices, and developed their confidence and leadership skills.

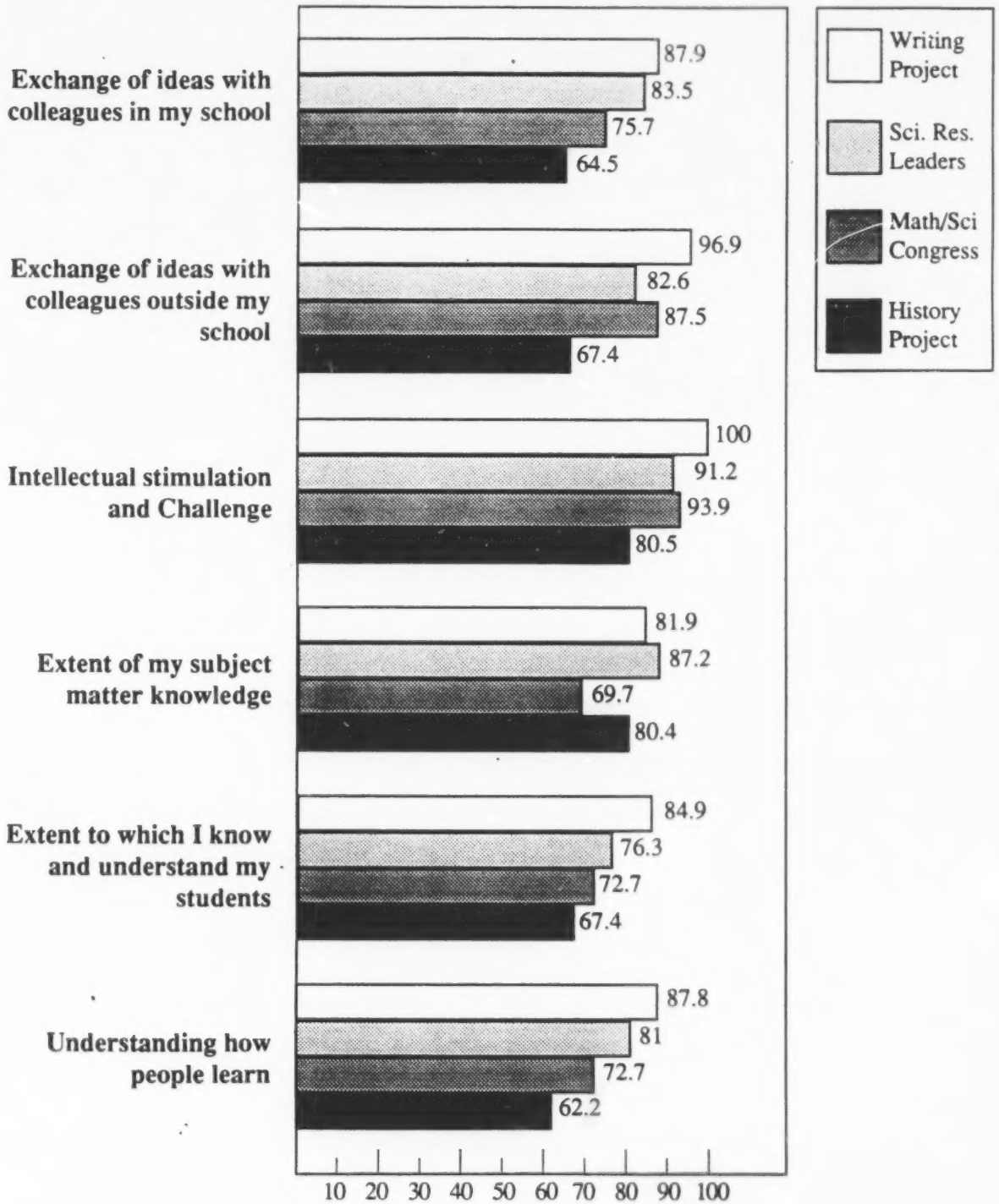
With the exception of the history teachers, the majority of respondents wrote most often about collegiality, networking, and community-building when asked in an open-ended question to name "the most important thing" they had gotten out of their network experience. (Table 3) (More than two-thirds of the history teachers, by comparison, ranked increases in new content knowledge and teaching strategies as most important.) In the closed-choice questions, impressive percentages, ranging from 64.5 percent (history) to 96.9 percent (Writing Project), reported a moderate to big increase in the degree to which they exchanged ideas with colleagues inside and outside of their school as a result of network participation. (Table 4a)

Table 3. Teachers' Views of the Most Important Benefits Derived from Network Participation*

	Science Resource Leaders (N=80)	Math/Sci Congress (N=33)	History Projects (N=47)	Writing Project (N=33)
Networking/Collegiality	50.6%	63.6%	31.9%	57.5%
Knowledge of Content/Pedagogy	49.4	30.3	68.1	30.3
Access to/Knowledge of Materials/Resources	19.7	6.0	10.6	0.0
Leadership Skills/Opportunity	9.9	27.3	2.1	18.2
Confidence	11.1	18.1	10.6	18.2

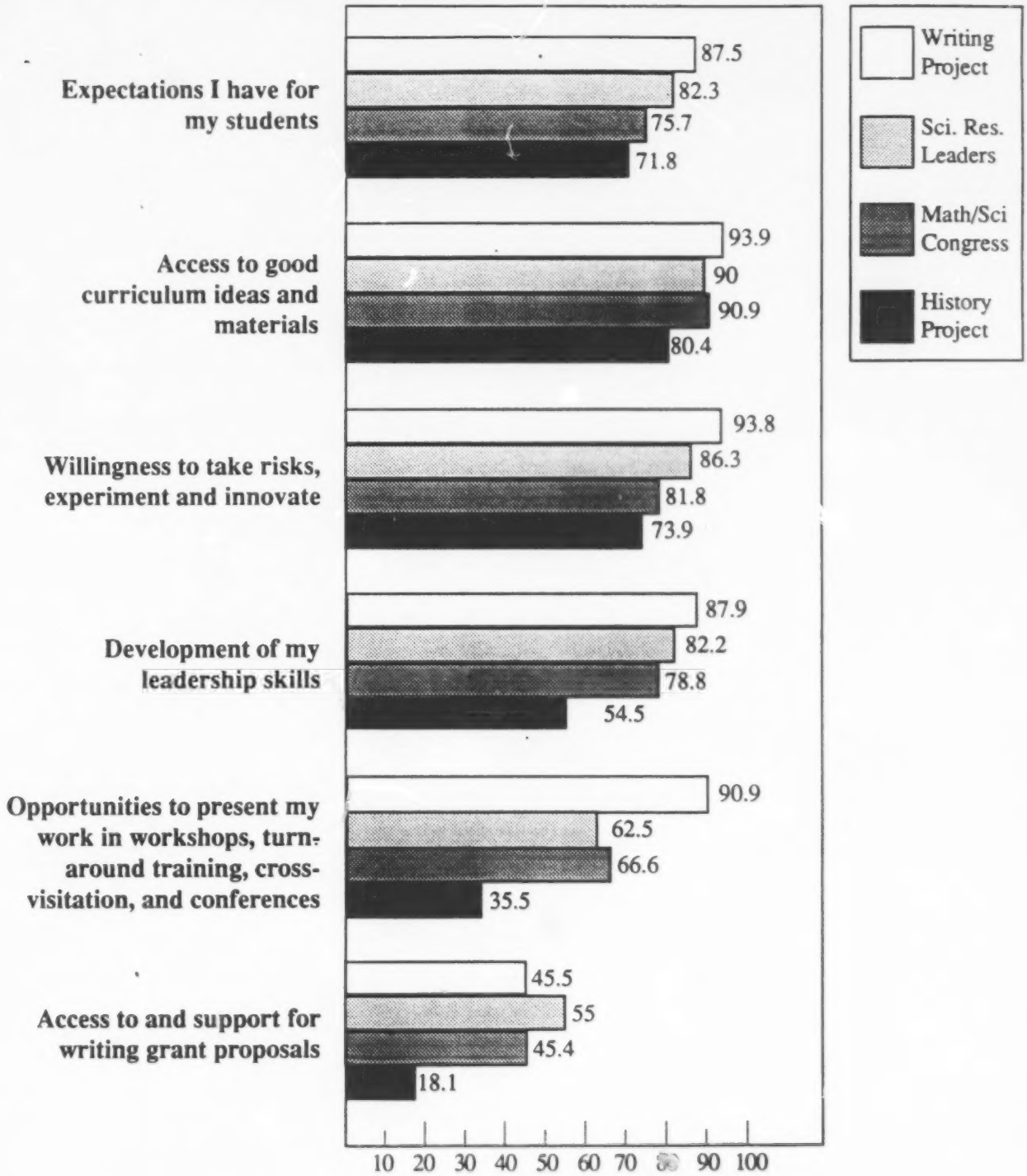
* Respondents were asked the following open ended-question: "What is the most important thing you have gotten out of your network?" Up to three answers were coded and the most frequently mentioned items are listed here.

Table 4a. **Percentage of Teachers Reporting Moderate to Large Increases in Aspects of Job Due to Networks***



*Increase defined as a score of 4 or 5 on a 5-point scale where
1 = decrease, 2 = no change, 3 = small increase, 4 = moderate increase, 5 = big increase
Writing N = 33, SRL N = 80, Math N = 33, History N = 47

Table 4b. **Percentage of Teachers Reporting Moderate to Large Increases in Aspects of Job Due to Networks***



*Increase defined as a score of 4 or 5 on a 5-point scale where
1 = decrease, 2 = no change, 3 = small increase, 4 = moderate increase, 5 = big increase
Writing N = 33, SRL N = 80, Math N = 33, History N = 47

The quotes from the focus groups capture the teachers' feelings:

> The thing I enjoyed most was just the kind of collegial sharing of meeting people whose excitement and enthusiasm for math and science ... helped me grow, helped me keep enthused. (Math teacher)

> There's always somebody in the SRL network that can give you something else to do or can tell you that that sounds cool, and help you to refine it a little bit, polish it a little bit. (Science Resource Leader)

> The first summer writing institute changed my life as a teacher... There is something about that summer institute experience... There are people who I was with that summer or people who were in my journal group and it doesn't matter how long time goes by when I don't see them, the minute we see each other or talk to each other, there is ... a kind of connection that is 180 degrees different from what usually occurs in the District. (Writing Project teacher)

> A major advantage of the Math Congress is that ... I link with a whole lot of other people who are finding the same kind of fights in their schools, and none of us solved the problem, but we're all fighting the same battle, and when we come together we could look at each other and kind of say, you know, I've not only been there, but I was there just before I drove in here. (Math teacher)

> Prior to the Writing Project, I was the consummate loner. The teacher who went into his room and closed his door and was subversive in there but did not talk to others ... The largest change that PhilWP has brought into my life is that I hang out with a lot of people. I know many more people than I ever thought I would know ... [and] it has all been so much fun. (Writing Project teacher)

> I think that the thing that the Urban Mathematics Collaborative really did was it dragged me back out of my classroom ... I got excited, I mean, I had a mission. I was going to be the person in the school who talked about standards for teaching mathematics, even though nobody else wanted to hear them ... [and] I and enjoyed interacting with teachers from all over the country. (Math teacher)

Teachers also spoke highly about the intellectual stimulation they had experienced in a number of network institutes and workshops and the degree to which their knowledge of academic content had been deepened. (Table 4a) In three of the networks, more than 90 percent of the respondents (100 percent in the Writing Project) gave moderate to high marks on the intellectual stimulation and challenge provided by network experiences and the fourth network (history) weighed in strongly on this point as well (80.5 percent). Nearly 70 percent or more in all the networks said their subject matter knowledge increased to a moderate or large extent. Science Resource Leaders gave the highest marks on this point (87.2 percent), an expected result since they participated in extensive subject matter training and did not necessarily come to their jobs with strong backgrounds in science. As one SRL put it, "Our content knowledge was ... raised so much and so intensively in such a short period of time ... " Other respondents commented on these issues as well:

> One of the things that I really value in the Writing Project is the intellectual

component ... I think that the kind of stimulation that I found there was very important in terms of affirming the pedagogical aspects of teaching ... The Writing Project brought a whole new level of understanding to the way that education works. (Writing Project teacher)

I remember sitting in the American Philosophical Society and being given information on how to do research in the library ... And I remember being in total awe of sitting there in this very prestigious institution where you can't just walk in and just thinking 'oh my goodness, this is just, this is just too exciting. This is absolutely too exciting," which then said to me 'hey, if I think this is pretty cool, I will bet kids might like to be out in a place that is really special too.' (History Project teacher)

I think [the Writing Project] was the first place that ... I found out that ... having questions and asking questions was really okay. In fact, that it was smart to have questions ... I think the culture of schools has always been if you have questions and dare to ask them, it is an indication of not being a good teacher. (Writing Project teacher)

On broad issues related to student learning, large majorities of teachers in the four groups again reported that network experiences had a moderate to high impact on their outlook. (Tables 4a and b) They reported increases in their understanding of students (ranging from 67.4 to 84.9 percent) and how people learn (62.2 percent to 87.8 percent), in their expectations for their students (71.8 percent to 87.5), in their access to good curriculum ideas and materials (80.4 percent to 93.9 percent), and in their willingness to take risks and to experiment in the classroom (73.9 percent to 93.8 percent). A few comparisons among the networks are noteworthy. On all five of these variables, the Writing Project teachers reported the highest degree of impact and history project teachers registered the lowest percentages, with the SRLs reporting the second highest ratings on four of the five items.

In the open and closed-choice survey questions, the interviews, and the focus groups, respondents also talked about the networks' role in validating their deep-seated beliefs and practices, in raising their confidence levels, and in providing the opportunities to learn about leadership and to become leaders and change-agents themselves. (Tables 3 and 4b) Nearly 80 percent or more of the respondents in the SRL, math, and Writing Projects reported a moderate to large increase in the development of leadership skills, with a smaller but still substantial percentage in history (54.5 percent) indicating a similar result. Almost all of the Writing Project participants (90.9 percent) noted measurable increases in professional development leadership opportunities such as cross-visitations and turn-around training and large majorities of the math and SRL teachers (66.6 percent and 62.5 percent respectively) reported the same outcome. A little more than a third (35.5 percent) of the history respondents registered such an increase. Around half of the teachers, with the exception of those in the history projects (18.1 percent), indicated a moderate to big increase in access to and support for writing grant proposals. Teachers raised these issues in the focus groups:

On Validation:

You know, [I always did] crazy alternative things, but since I've been in the SRL group, I felt a little better about some of these things. It's funny to say that, but I used to get criticized for not using textbooks, for doing all these activities and for not following the sequence of the curricular guides, and now I feel ... validated about it. (SRL teacher)

My involvement [in the history project] forced me to stretch ... once you got around these other people you found out that what you were doing was right. So you got validation ... and that was the thing that helped pull someone like me out. (History project teacher)

[The Writing Project] helped me reach inside and pull out an inner me that had been kind of dormant for some years ... Which then allowed me to go back to my location in the fall feeling more confident and able to help my students search within themselves for the inner student that had been inside. (Writing Project teacher)

I went back into my classroom as a radically different teacher in some ways and in part because what the Writing Project did was validate some beliefs that I had had for a long time but was timid about putting into action in my classroom. So it gave me the confidence to sort of move along with my belief system ... (Writing Project teacher)

On Confidence and Leadership:

By participating in the Math/Science Congress activities, I really think a person feels a sense of teacher empowerment, that an individual teacher can go for resources ... you don't have to wait for someone to hand it to you, you can go out and get it. (Math teacher)

When I look at what other groups are doing that I'm involved with, I'm like almost light-years ahead, and when I go out all over the state, they all turn around and they look at you and they go *'you're from Philadelphia?'* (SRL teacher)

My confidence has improved, and my ability not to be worn down by naysayers, the ability to maybe be the only one who's kind of interested in doing something, and not saying 'why should I bother?' (Math teacher)

I really appreciate the network ... [with regard to] the ability to lead a workshop and feeling like you're on the cutting edge of new developments. I know that we were talking about learning outcomes when nobody else at our school had any idea what we were talking about. (SRL teacher)

Network Impact on Teachers' Self-Reported Classroom Practices

Teachers were asked to report on the degree to which their involvement in the curriculum networks had changed their classroom practices in ways that would actively engage students in learning. These instructional practices included use of more diverse methods of teaching; greater reliance on "constructivist" methods such as hands-on activities, labs, learning activities outside the classroom, long projects, problem solving, and student reflection; development of performance assessment strategies; encouragement of interaction among students in critiquing and sharing ideas and work; increased emphasis on writing and on revision of work; and greater use of technology. In reviewing these data, it is important to keep in mind that these are self-reports of teachers. We did not have observational data to verify these answers.

Teachers' responses to these questions varied significantly by network. (Tables 5a and b) On 12 out of 15 items, Writing Project teachers were more likely than teachers in other networks to report a moderate or big increase in their use of the classroom practices noted above. The margin of difference was at least 14 to 15 percentage points or more in ten the comparisons. More than 90 percent of the Writing Project respondents claimed to have increased their use of diverse teaching methods, long interdisciplinary projects, frequent and extensive writing assignments, performance assessments, student reflections on their work and goals, and students' sharing ideas with peers in pairs or groups. Writing Project teachers also had much higher proportions than other network groups reporting increases in students' critique of others' work and revision of their own work, in the use of Socratic questioning, and in encouraging students to connect their assignments to experiences outside of school.

Science Resource Leader respondents led the networks in registering moderate to big increases in the use of hands-on activities, manipulatives, and labs (78.5 percent) and in undertaking learning activities outside the classroom (64.6 percent). In 13 of 15 items, SRL scores were the second highest among network respondents behind the Writing Project. The math respondents were more likely than the other groups to indicate increases in the students' use of technology. While the self-reports of changes in instructional practices were generally lower for the mathematics and history project teachers, the percentages in those groups reporting increases in the itemized classroom practices were often substantial.

In six of the classroom practices listed, a majority of teachers in all four or three out of the four networks indicated moderate to large increases on those items. Overall, the networks did well in their traditional areas of strength: science in hands-on learning, the Writing Project in its emphasis on writing, and mathematics in the use of technology. This finding parallels that of the study of the Los Angeles teacher networks (Aschbacher, 1994).

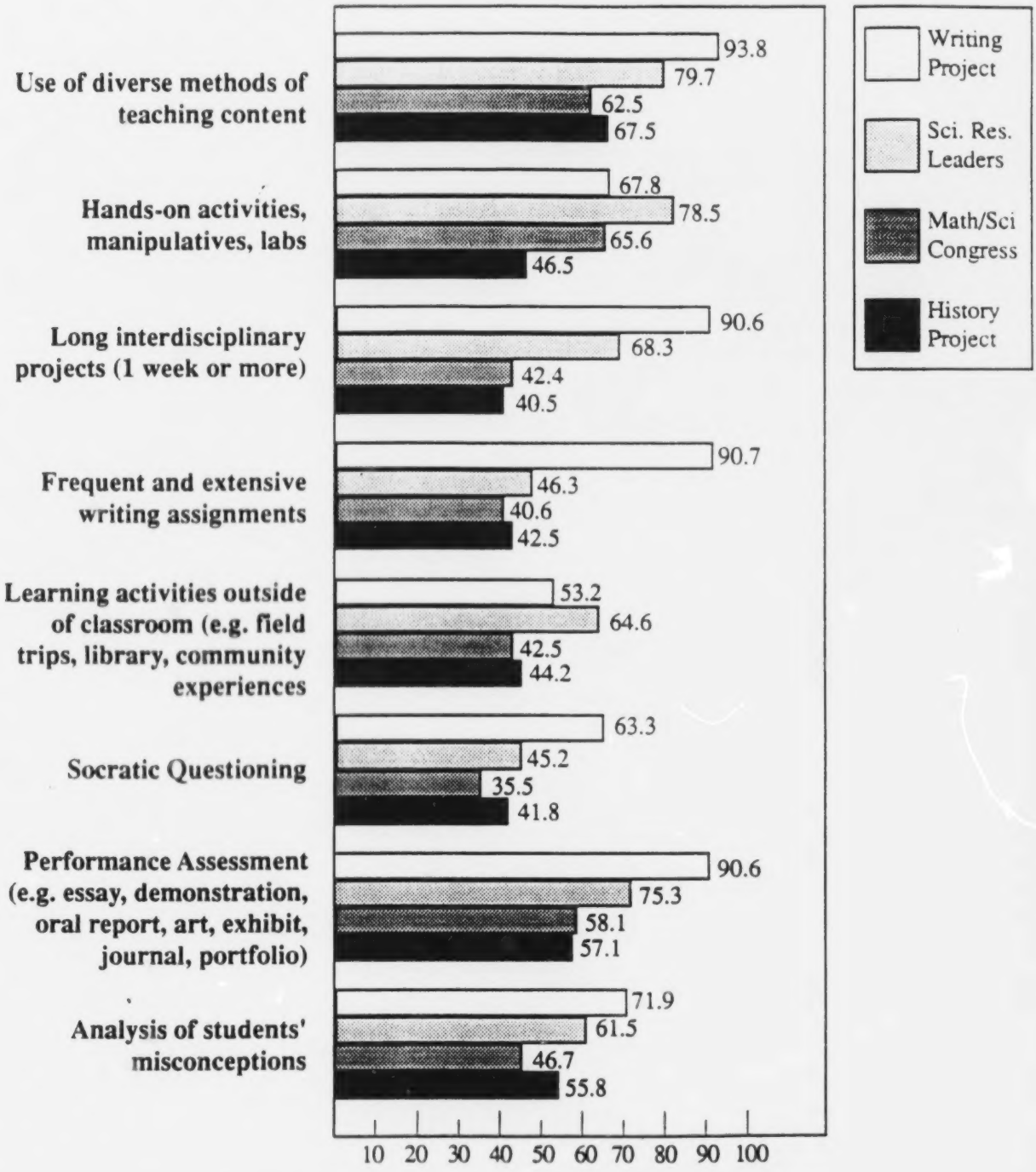
Teachers elaborated on the changes they had implemented in their classrooms in the focus groups and interviews. Participants in the Women in World History project, for example, talked enthusiastically about their efforts to infuse the study of women and social history into coursework in ways that engaged student interest. Writing Project teachers spoke of organizing individual conferences about writing with students of all ages, including parents in classroom activities, raising taboo issues of race and ethnicity in discussions of literature, and immersing children in reading books. Science Resource Leaders stressed their work around improving the quality of science fair projects and in creating an atmosphere of excitement and exploration in their classrooms. Network experiences caused teachers to change their instruction in ways that elude easy definition:

> I think I take more time to laugh and enjoy my students. And that seems strange but we are really doing neat, interesting things and I think I have them engaged and I can sit back and say 'wow, that is a neat idea. Or, hey, that was a really wacky statement, I guess you got me with that one' ... I value them and they feel valued. (World History Project teacher)

> I'm more comfortable with trusting my student to do self-assessment, self-evaluation, team assessments and group assessments. Why? I feel my children have learned more by doing it. (Science Resource Leader)

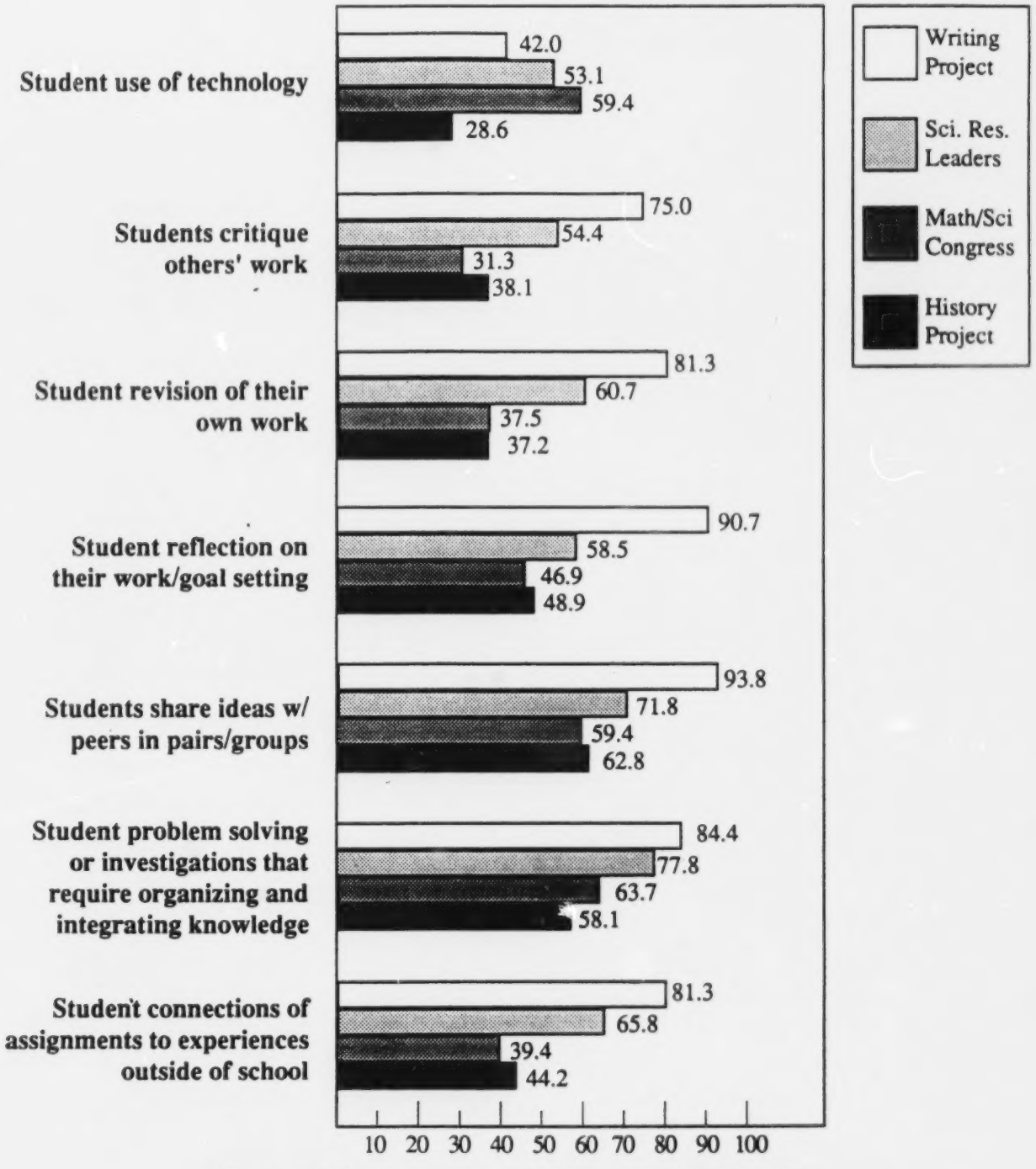
> When I changed my classroom I did a tremendous amount of writing. I wrote and the kids wrote. One thing that I think that it changes is that, especially for kids who are labeled ... they are not members of the club. And the club is sort of an intellectual club of readers and writers. So when we did lots of

Table 5a. **Percentage of Teachers Reporting Moderate to Large Increases in Selected Classroom Practices Due to Network Influences**



*Increase defined as a score of 4 or 5 on a 5-point scale where
0 = never used, 1 = decrease, 2 = no change, 3 = small increase, 4 = moderate increase, 5 = big increase
Writing N = 33, SRL N = 80, Math N = 33, History N = 47

Table 5b. **Percentage of Teachers Reporting Moderate to Large Increases in Selected Classroom Practices Due to Network Influences**



*Increase defined as a score of 4 or 5 on a 5-point scale where
0 = never used, 1 = decrease, 2 = no change, 3 = small increase, 4 = moderate increase, 5 = big increase
Writing N = 33, SRL N = 80, Math N = 33, History N = 47

writing over a period of time, many of them began to see themselves as part of that club. (Writing Project teacher)

I find that because I am looking more critically [at my students] and I am waiting before I make judgments, I am knowing them better and they also seem to know me better. I am finding that the trust relationship is established much earlier in the school year than it had been before the Writing Project ... And it is sustained much longer. (Writing Project teacher)

Before PhilWP, I had notions of blaming kids and parents for teaching and learning ... I didn't see they might not be able to learn the way I learned. PhilWP totally shook my thinking and made me see the child first. I remember the exact day and time. I broke down and cried because I had cared so much for my kids ... When I changed my teaching around, it was just miraculous, the results that I saw. (Writing Project teacher)

The Influence of Networks on School Reform in Teaching and Learning

Although most of the professional development activities of the networks studied here have taken place outside of school settings, networks have had some impact on schools beyond their individual participants' classrooms. In fact, all of the networks studied here had a school-based component to their work: the World History Project was designed to create a curriculum that would be adopted in high schools system-wide; the Women in World History Project participants enrolled as school teams with the explicit charge to disseminate their work in their schools; a core activity of the Writing Project has been teacher cross-visitation to classrooms during the school year; the Science Resource Leaders program was designed to create a team of school-based teacher-leaders in science in every middle grades school; and the Urban Mathematics Collaborative originally began with a strong base among high school department heads who drew department members into Collaborative activities.

The networks are in the process of refashioning their work to align with the systemic change plan of Philadelphia's Superintendent of Schools, David Hornbeck. Hornbeck's action plan, "Children Achieving," released in February, 1995, calls for a radically decentralized district with small learning communities of 200-500 children in all schools and 22 K-12 school clusters consisting of a neighborhood (non-magnet) high school and its feeder middle and elementary schools, each with its own professional development programs (Teaching and Learning Networks). The Writing Project and Math/Science Congress are planning summer institutes and year-long follow-up activities with the aim of developing viable learning communities and teacher-leaders, and the Women in World History group is exploring ways to redirect its work to be useful in middle-to-high school cluster curriculum coordination. The future work of Science Resource Leaders will be folded into further teacher professional development in school clusters coordinated by the Urban Systemic Initiative.

The survey data from network teachers indicates that large proportions of them are engaged in systemic reform efforts at the school, sub-district, or district level (and, for some teachers, beyond that to state and national initiatives). (Table 6) For example, between 33 to 40 percent of the respondents in the math, SRL, and history networks and more than half (57.6 percent) of the Writing Project teachers claimed they were formally involved in committees or pilot sites in alternative assessment. Between 40 and 51 percent of the respondents in each network are serving on curriculum outcomes and standards task forces. These numbers are high in part because network members are actively recruited by District

officials when constituting task forces in curriculum areas. The respondents in this study, especially those in the Math/Science Congress, the Writing Project, and Science Resource Leaders, credit the networks with increasing their knowledge about standards, assessments, and national school reform issues.

Significant numbers of network members are also active in site-based Governance Councils or Chapter 1 School Leadership Teams, ranging from nearly 27.7 percent in the history projects (who work in high schools where school governance opportunities are lower) to 54.5 percent in the Writing Project. Participation in this non-remunerative and time-consuming work indicates that network members tend to have strong internal incentives to participate in professional and school improvement efforts.

Table 6. Percentage of Network Respondents Participating in Committees/Task Forces on Standards, Assessment, and School-Based Management*

	Science Resource Leaders (N=80)	Math/Sci Congress (N=33)	History Projects (N=47)	Writing Project (N=33)
Curriculum Standards/Outcomes	46.9	51.5	40.4	45.5
Assessment Pilots/Committees	39.5	33.3	36.2	57.6
School-Based Management Team	42.0	39.4	27.7	54.5

* The question asked whether respondents had served on task forces, committees, or pilot projects at the school, region, or district level or on a school Governance Council or Chapter 1 Leadership Team.

An open-ended survey question asked teachers what aspects of their network, if any, had stimulated reform at their school. The responses varied substantially by network. The percentages responding "none" or who failed to answer the question (which we perceived as a negative response) were much higher in the history and math networks (57.4 percent and 45.4 percent respectively compared to 27 to 30 percent in the other two networks). (Table 7) There are several plausible explanations for this finding. All of the teachers in the history projects and half of the math respondents work in high schools whose organizational complexity, along with other factors, makes innovation more difficult (Louis, Marks, and Kruse, 1994; Louis and Miles, 1990). Mathematics departments are especially reluctant to embrace change in curriculum and instruction (Grossman and Stodolsky, 1994; McLaughlin and Talbert, 1993b; Stodolsky, 1993; Talbert, 1995). Moreover, the World History Project teachers had experienced first-hand the failure of School District and high school officials to institutionalize the curriculum they had labored so hard and long to produce. The World History Project, more than any other network, focused on revitalizing individual teachers from many high schools rather than on locating change processes in school buildings. As one participant put it:

> Networks can sustain teachers but it takes the pressure off [schools] to force issues inside the school. The network conversation has to be embedded in the schools ... [The World History Project] made me be seen as a crazy person when I came back to my building. It made me more of an outsider.

On the positive side, many teachers reported that change had occurred at their school as a result of the influence of the networks. Sizable percentages of SRLs reported increased use by teachers of new materials, texts, and technology (21 percent) and "hands-on" teaching methods (32 percent). Many were deeply involved in organizing science fairs. More than 40 percent of Writing Project respondents wrote that writing and literacy initiatives had taken hold in their schools and another 21 percent indicated success in gradually winning over colleagues to new perspectives and approaches. More than a fifth of the math respondents claimed that other math teachers were increasingly using problem-solving approaches and other "constructivist" teaching methods in their schools. Changes in assessment, initiatives in interdisciplinary study, increased collaboration and collegial reflection, new work in curriculum development, involvement in creation of small learning communities, greater adoption of new curricular content and perspectives, and greater support for new teachers were among the other reforms mentioned by smaller percentages of respondents.

Teachers gave numerous examples of the network's influence at their schools during the focus groups and interviews. Writing Project teachers talked not only about specific curricular initiatives but about the Project's emphasis on reaching out to other teachers in a non-judgmental way:

> When I go back to my school and look at my colleagues, I ... see them with a new-founded love and respect for the work that... we are all doing ... It is important to remember what I learned in PhilWP about ... respect for colleagues and disagreement and different ways of looking at things.

> From the very beginning PhilWP was the thing that first led me to talk to other teachers about teaching and learning. As far as I am concerned, that is a critical element in school reform. The idea that teachers talk to each other about that, share ideas about that and work together to develop programs for kids. PhilWP sort of sent us out to change our own classrooms and to work with other teachers and to talk with other teachers.

> [My charter] exists for a number of reasons. PhilWP is the key to that because one reason is that it gave the three of us [teachers] a common language to begin with ... It taught me how to deal with process and to hear disagreement and dissonance among colleagues ... and work through the tough stuff and stay with it.

History project teachers also shared perspectives on collaboration and bringing change to the school building:

> I was so accustomed to being a part of some kind of collaboration [during the World History Project] that I had to get into a charter at my school ... I didn't talk to other history teachers about what I was teaching in my classroom prior to the World History Project ... I don't think I could really function now if I were not meeting at some point with other teachers ... It is just a way of life now.

> [It] is hard to convert people over to your flaming cause because they weren't in the experience as we were, but you can give them little pieces, you can say 'look, here is something you can use ... You don't have to buy the rest of the ball of wax, but take this,' and what sometimes happens is that they say 'gee, this worked, maybe I will try something else.'

> Another thing ... is getting the resources. Money is so tight and just to be able to get these things (from] Women in World History who have wonderful materials ... People will base assignments on that and the kids will use the material. It's incredible.

Math teachers commented on specific pedagogical initiatives and the importance of the network in sustaining reform energies:

> Without all this [the Urban Mathematics Collaborative], ... the kids at my high school would not be required to buy graphing calculators ... Last year, I wrote a grant that involved another teacher and myself. You have four Algebra II classes, and three of them were assigned calculators [and were] very happy campers. The fourth Algebra II class that did not have the calculators, well, most of them flunked both math and physics, whereas the other three classes were doing very nicely in math and physics ... My colleague and I marched into the principal's office and said, 'you've got to make every kid buy a calculator,' and she said 'yes,' and without all of this, I don't think that ever would have happened.

> [The Math/Science Congress] continues to support those people who have said 'despite all the aggravation, I think I'm going to try and continue to be a change agent within my building.' I think that is one of the strongest places where the Congress works for that kind of change.

Science Resource Leaders told stories of school-wide changes in science teaching:

> When I first came to my school, all the hands-on equipment that did exist in the school was locked up in a closet [and] everybody used textbooks ... So when I came I [said] 'something is definitely wrong here.' I piloted the 6th grade kits ... We did staff development with our staff ... so our kids from grades K to 8 all do science fair projects ... and the Museum-to-Go Kits ... are now distributed throughout the whole school.

> I think we can honestly say that from the time we started with SRL until now, what we have seen happen to our science department is incredible and really [the teachers] will come and they will ask for things ... They all do hands-on science now and most of them participate in the science fair.

> I have special little science passes that I give to all of the teachers, and if they want to let a kid come up and use my science resources as their library during a time when they don't have to be in class, even if I'm teaching they can come and do that.

Network practices and perspectives are sometimes disseminated more widely when participants are promoted to positions as administrators, high school charter coordinators, department heads, curriculum coordinators of various types, and teachers on special assignment. While the majority of network respondents have remained in the classroom, a small but significant number have been promoted or reassigned to non-teaching positions and attribute their program involvement as a factor in the change of position. The percentages ranged from as many as 23 to 24 percent in the history and writing projects to 18.2 percent among the math respondents and 12.3 percent among the SRLS. One focus group participant referred to Writing Project participants who had become administrators as being nondictatorial, "still having that working-together mode."

Network involvement appears to enhance cooperation at the school--and now cluster--levels among participants in each network. (Table 7) Between half to three quarters of the respondents in all networks reported that their personal acquaintance with another network member assigned to another organizational unit of the school enabled them to share resources, a significant phenomenon in a resource-poor district where teachers are reduced to hoarding supplies and materials and restricting access to the copying machine. Smaller but still significant percentages (25.5 percent to 51.5 percent) in all four groups noted that such personal connections made it easier to start an initiative within a school or cluster. Some teachers, ranging from 14.9 to 21.2 percent in three of the networks, said that the network connection facilitated their transition into a new school (in a district where transfers are common). These sorts of personal ties and friendships will assume greater significance as the District tries to create small cooperative learning communities and frequent collaboration across school levels.

Table 7. Percentage of Respondents Claiming that Personal Relationships Established through Networks Facilitated In-School Collaboration

	Science Resource Leaders (N=80)	Math/Sci Congress (N=33)	History Projects (N=47)	Writing Project (N=33)
Enabled Sharing of Resources Across Units Within a School	76.5%	54.5%	61.7%	69.7%
Made It Easier to Start an Initiative in School/Cluster	50.6	33.3	25.5	51.5
Facilitated My Transition into a New School	16.0	6.1	14.9	21.2

When network participants were asked about specific ways their organizations could play a role in the delivery of professional development under David Hornbeck's plan at the school and cluster level, most offered specific ideas in response. They hoped to organize and offer workshops, in-class support for teachers, summer institutes, and year-long research and study groups across grade and school levels on curriculum and instruction. They suggested organizing cluster events and competitions, writing curriculum guides and materials, and even staffing schools identified as especially troubled. Some respondents also thought that the networks could be an entity providing disciplinary cohesion and coordination in a newly-decentralized district.

The frequency and range of these suggestions varied by network. Because SRLs and Writing Project participants are already deeply involved in School District professional development at the school and regional levels, a substantial majority of them had ideas about implementation. Nearly all Writing Project respondents had specific suggestions. Although the Math/Science Congress as an entity is not tied in as a partner with the District, most Congress members were also eager to play a more substantial role in teacher professional development. The history project members, the majority of whom did not answer the open-ended question, had far fewer ideas about their role in the reform process and, on the whole, were still wary of what was to come. A recent qualitative study of the Women in World History Project did find, however, that its members were enthusiastic about their work and interested in disseminating it to others (Higgins, 1994).

Obstacles to Network Influence and Durability

The vulnerabilities of teacher networks are obvious. Dependent on "soft money," based outside of school districts in organizations which themselves experience vicissitudes in funding, caught up in the inevitable struggles over turf in politically-charged urban districts, and often lacking a stable governance structure, networks can easily fall by the wayside. Indeed, a 1994 evaluation of the Urban Mathematics Collaboratives noted that two of the Collaboratives no longer exist and several others are vulnerable to dissolution (Heck, Webb, and Martin, 1994).

In this study, respondents were clearly worried about the future of their project. When asked in an open-ended question in the survey about obstacles facing the continued existence and expansion of their network, teachers highlighted a range of issues. Their first concern was sustained funding to continue their work. Almost two-thirds of the math respondents (63.6 percent) and more than half of the SRLs (53.1 percent) thought that lack of future funding was a real threat to their existence. As one math teacher put it, "Unless there are some committed dollars, we are almost history." More than two-fifths of the Writing Project teachers expressed similar concerns, with an additional 15.2 percent expressing the view that the School District's de-funding of the Writing Support substitute teacher positions which had enabled cross-visitation had been a serious blow to the Project. Fewer history project respondents mentioned funding (and 27.7 percent did not respond to the question at all), perhaps because it was a moot issue in the case of the defunct World History Project.

The second most frequently-mentioned obstacle was lack of time for teachers to devote to the network, especially during the school year. Two thirds or more of the respondents in each network had noted in another question that their involvement in the network had caused a moderate to big increase in the time they spent outside school hours related to their job. The issue of time constraints and teacher burnout, of course, is a perennial one in studies of teacher professional development activities. Another barrier cited by the teachers was the resistance or reluctance of other teachers, especially high school teachers in mathematics and social studies, to become interested in network approaches or opportunities.

> There's a vast number of seasoned staff in my high school who have been teaching math the same was it was taught to them ... Trying to get them to see mathematics in a different way, to try to get them to understand the kind of experiences that kids have to have before they can internalize mathematics and make it part of them, and use it, has been extremely difficult, extremely difficult. (Math teacher)

> [Many of] my colleagues ... go into their room and do their own thing and they don't want to hear mine ... and if I have a handout and I say 'I'll give it to you in writing,' [they'll say] 'I don't want it, I'm not going to use it, I don't want to know what you're doing, I do my thing'... I've almost given up presenting things at my school because I've gotten that severe a reaction. (Math teacher)

> Somehow I would like to pass that learning onto my colleagues and have them share. And sometimes they listen very attentively. They see my enthusiasm, my excitement about it but it doesn't translate into any difference in their style of teaching. (History teacher)

Smaller percentages of teachers cited other difficulties facing network as well. Some noted the lack of awareness or support of building principals for networks' activities. Others, especially Writing Project teachers, felt that the networks' resources were underutilized by the District because of the Project's low visibility. (This was not a problem cited by SRLs since their project is co-directed by District personnel.) Some teachers expressed the general fear that their project would fall victim to inevitable cycles of reform:

> Teachers are used to being stabbed in the back. You always talk about reforms and then just as we are reaching for the brass ring, they not only pull the ring away but they pull the horse away as well. (History teacher)

> We don't have a process that we can follow through on for a long enough period of time so we can say 'it's working.' Because perhaps three years or four years into it, some wily rascal who has the ear of somebody else, is going to bring in some sort of a new initiative ... The teachers ... need to have some sort of long term support system, like a Math/Science Leadership Congress. (Math teacher)

> Traditionally, as far as I see it, one network has followed a network has followed a network, and they haven't maintained [continuity]. (SRL)

This last comment speaks to a related concern specific to mathematics and science teachers. Because there have been so many externally-funded professional development initiatives over the last decade in mathematics and science, (unlike the humanities which has been relatively neglected), new entities are created around each major project. Teachers express fear that established networks will be ignored as new ones are created ("How could they not want to use a network that's already in place?") and that little coordination will be provided for various groups' initiatives.

Several teachers in the interviews and focus groups noted the need for some central coordination and support for subject-area networks and projects as the School District decentralizes to 22 feeder cluster patterns. As one teacher put it: "When there's no one to maintain the network and ... there's no one to coordinate the network ... You can't have people doing that work [leading professional development] for you unless somebody is rejuvenating and re-energizing and maintaining that group of people."

Discussion and Conclusions

The findings from this research support the conclusions of other investigators that teacher-centered subject-area networks provide powerful learning experiences for their participants. Across the four curriculum collaboratives studied here, large proportions of teachers credited these projects with contributing to their professional growth and to changing their classroom practices. Many respondents spoke and wrote with great feeling as they described how the network had changed their professional lives. The success of these collaboratives in recruiting new adherents to energizing veteran reformers is especially impressive given that their participants work in chronically-underfunded inner-city schools.

Evidence from this study goes further than some of the previous research on such networks in suggesting that network influences go beyond individual participants' practices and reach into the broader school community. The Philadelphia networks, while nurturing a core of innovative teachers in out-of-school settings, have deliberatively designed much of their work to draw in larger numbers of teachers back at the school. This is especially true

in the case of Science Resource Leaders and the Writing Project. But the results are only suggestive because this study was based on individual-level data and not on systematic information on network influences at school sites. Overall, the effect of the work of these teachers on schoolwide reform is limited--they constitute, after all, only about five percent of the district's teaching workforce--but their impact in some schools appears to be felt way beyond their numbers, particularly when they have the support of building-level administrators.

Furthermore, the high proportions of network teachers reporting involvement in task forces and committees on curriculum standards and assessments and in school-based management initiatives indicate that network participants are active change agents in their schools and broader policy settings. This finding is congruent with Webb and Romberg's (1994) conclusion that the influence of Urban Mathematics Collaborative teachers was magnified when they took advantage of involvement in other reform opportunities. They found that the Collaborative teachers, already schooled in an array of leadership and training experiences, were more likely than their colleagues to become involved in school-based management or common planning time or other reform efforts when such initiatives became available. Teachers in the Philadelphia networks appear to have that same proclivity.

Variations in Network Effects

As in Los Angeles, the size of network effects differed across variables, with groups showing strength in their traditional subject areas (Aschbacher, 1994). On most factors, however, the Writing Project teachers and Science Resource Leaders had higher percentages of respondents reporting positive outcomes. The fact that their members were so enthusiastic is of particular interest since participants in the two projects came from different sorts of teaching backgrounds. Acceptance into the Writing Project summer institutes is competitive (with two to three applicants for every opening) while SRL organizers had to recruit participants to fill program slots. Many of the SRLs had little experience or training in teaching science and ranked low in seniority while Writing Project teachers tended to have stronger academic preparation in their field and to have more years of teaching experience.

Despite these differences, the SRLS and Writing Project teachers responded in similarly positive fashion to their network professional development experiences. In both cases, the participants were eager to learn and to commit major blocks of time during the summer, after school, and on weekends. Both networks sponsored multi-year programs with in-school follow-up activities where the teachers themselves assumed leadership roles. Teacher inquiry and research was emphasized in both cases. Participants were encouraged to become active in professional associations and relevant School District initiatives. Regular newsletters, conferences, and events have knitted participants together.

But comparisons between these two networks with the history and math groups must be made with caution since the networks are at different points in their organizational histories. The NSF funding for Science Resource Leaders is in its third and final year and the network is at a high point of activity. The Writing Project has enjoyed stable funding from multiple sources and has not had to face the termination of a core grant. By contrast, the initial Ford grant for the Math Collaborative ended in 1990 and the Rockefeller Foundation funding for the World History Project funding ceased in 1992. The fact that the Math Collaborative teachers have been able to sustain themselves as an independent entity is no small achievement. They have raised money, organized professional development activities, and supported one another's efforts at being change agents in their schools. Several World History Project teachers have emerged as leaders in other major reform efforts in the School District and/or went on to organize and participate in the Women in World History Project or related spin-off programs.

A final word should be said about the Writing Project because it has proven to be the most durable of the networks. Its work is gradually being integrated into the creation of small learning communities--charters in the high schools and new units being developed in other school levels--and into other reform efforts in history, multi-cultural education, teacher and staff study groups in the comprehensive high schools, and outreach efforts to parents. Since it expands the numbers of participants year after year, a critical mass of Teacher Consultants is developing in some of the District's schools. Throughout the course of this study, its members demonstrated greater engagement in the data collection process--e.g. a higher response rate with less prodding, the largest turnout for the focus groups, and significantly higher responses to open-ended survey questions.

The comments of Writing Project participants in interviews and focus groups and on the questionnaires were remarkably free of cynical and negative forecasts about the future of reform efforts in the School District. This was true even among the respondents who were high school teachers, the great majority of whom could give examples of how the Writing Project's work had stimulated reform at their school. (By contrast, more than half of the math and history secondary respondents said that no change had occurred or did not answer the question.) Perhaps this is due to the Project's emphasis on teacher research and inquiry, its philosophy that good teaching is always a "work in progress," and its commitment to change over the long haul involving outreach to fellow colleagues. The comment of one participant conveys this perspective:

> I think that something PhilWP has learned, in part through developing an inquiry stance, is that change happens slowly. It happens through conversation. It happens through struggle. It happens through dissonance. It happens through people arguing. It happens when people share stories ... All of this takes a really long time and it takes equal voices.

Network Survival

Subject-area collaboratives are fragile entities. Deliberately created by funders to operate on the margins of school districts, these groups must develop strong ties to multiple groups if they are to survive. The Philadelphia Education Fund, along with other local education funds nationally, can continue to play an important role in consolidating interest and support for networks. However, we concluded that no single partner group can take responsibility for a network and sustain its activities over time. The partner organizations--local education funds, universities, professional associations, museums--themselves undergo organizational change, funding crises, and departures of the personnel who worked with the network. The school districts, whose active support is essential, are marked by frequent turnover of top officials, fiscal instability, and ever-changing reform initiatives.

Given the instability of the policy environment in which these collaboratives must work, a strong constant must be the teacher leadership group itself. The network has to develop its own governance structure with a stable set of leaders. Both the Writing Project and the Math Collaborative have succeeded in doing this in Philadelphia. The Writing Project has been helped by its long-term association with the University of Pennsylvania which has not only provided space but faculty leadership and support as well. The danger, of course, is that networks such as these existing outside of districts' direct influence may lose their visibility and inside support. Good relations with a strong subject-area coordinator in district central offices are often critical to a network's success (Middleton and Webb, 1994). At the other extreme, if a network's activities are totally subsumed within a district's central bureaucracy, its identity may become lost and the teacher-centered nature of

the enterprise will be compromised (Little and McLaughlin, 1991). A new concern is that districts become so decentralized that no centrally-located subject-area contact person exists to coordinate disciplinary initiatives and to serve as a contact point for collaborative ventures (Miller, Lord, and Dorney, 1994; Middleton and Webb, 1994).

In the last analysis, networks must raise enough money so that substantive work can go on. Such work involves recruiting new teachers, holding conferences, conducting workshops, visiting other teachers' classrooms and running summer institutes. Without the ongoing opportunities to engage in new work, a network will shrivel up and die. Collegiality alone is not enough to sustain such a group. In the case of the World History Project, for example, when funding ended and no new opportunities immediately presented themselves for continued work on that large a scale, the participants disbanded. All of the other networks currently operating in Philadelphia are facing or will soon face this challenge. Thus, paying attention to funding has to be understood to be a function of networks. That responsibility is the trade-off with their freedom from the direct control of a school district.

Networks and Systemic Reform

If networks are thought of as part of an overall professional development infrastructure of urban districts, their impact can be greater than that envisioned by their funders. Professional development of teachers and other staff, not to mention parents and school councils, is such a large task that school districts need to draw in a broad array of organizations--the subject-area collaboratives, universities, professional associations, local education funds and other groups--in order to get the work done (Miller, Lord, and Dorney, 1994). If this infrastructure is mobilized as part of an ambitious systemic reform plan such as that unveiled by Philadelphia's Superintendent of Schools in February of this year, then networks can provide a mechanism that helps link centralized curriculum and assessment initiatives with teachers in the schools. These groups have the credibility, experience, and organizational flexibility to deliver effective teacher-centered professional development that is aligned with the overall reform goals. Their longevity in curriculum affairs in a district is often greater than that of system officials. Moreover, their experiences provide models for the kind of professional development that teachers respect.

In decentralizing districts such as Philadelphia where schools and clusters of schools are given increased responsibilities, teacher networks can perform another important function. Network participants can help provide the leadership that will be sorely needed on local school councils, in school-wide planning efforts, and in the greatly-expanded professional development opportunities that are to be made available. Hundreds if not thousands of teachers will be called on to undertake these new tasks. The fact that Philadelphia is home to so many different teacher groups will be an asset as these initiatives unfold. If existing networks remain viable, teacher participants will be in a stronger position to assume some of this workload.

It is possible, however, that existing teacher subject-area networks will be overlooked, marginalized, or deliberately allowed to wither away in urban districts, even those undergoing sweeping change. If this occurs, districts will have failed to capitalize on the substantial sums of money invested in the training of network teachers and on the time and energy teachers themselves have invested. Scarce leadership resources will have been underutilized and new efforts will duplicate those of prior groups. New breeding grounds for cynicism will have been created and reform energies dissipated.

Philadelphia will be an interesting test case of the degree to which previously-existing teacher-driven curriculum networks can be integrated into a district's new strategy for

radical systemic change. When these networks were founded, the funders did not necessarily anticipate the current educational reform agenda and could not have had a precise notion of how these groups might fit into a change process that combines centralized initiatives with grass-roots participation in schools. The District's new leaders do not have to invent vehicles for teacher collaboration--they can begin by tapping the organizations and expertise that are already available.

Endnotes

1. Superintendent David W. Hornbeck's 10 point plan, "Children Achieving," calls for setting high expectations for students, using performance-based indicators in a meaningful system of accountability, shrinking the bureaucracy and letting schools make more decisions, providing intensive and sustained professional development for all staff, ensuring school readiness for pre-school children, providing students with the community supports and services they need to succeed in school, expanding access to state-of-the-art technology and instructional materials, engaging the public in school reform efforts, and acquiring additional resources for the District and using them effectively. The tenth point of the plan is that the first nine points must be implemented together, not in piecemeal fashion.

2. The **National Writing Project** funds 158 writing project sites with funds appropriated by the Elementary and Secondary Education Act through the U.S. Department of Education ($3.2 million in 1994-95). Writing Projects have received financial support from many sources including the National Endowment for the Humanities, the Andrew W. Mellon Foundation, and some state legislatures. The work of the NWP's Urban Sites Network (that includes Philadelphia as one of its 10 sites) was funded by the DeWitt Wallace-Readers Digest Fund. The Ford Foundation established five **Urban Mathematics Collaboratives** in 1985 followed by another six in 1986, and an additional five "replication" collaboratives between 1987 and 1991. Collaboratives received grants over a five-year period which funded from 29 percent to nearly 50 percent of their work. Overall, resources devoted to the Collaboratives ranged from about $650,000 to $2 million per site over the grant period (Webb, Pittelman, and Pitman, 1994). Seventeen separate **CHART Projects** in the arts and humanities aimed at strengthening multi-cultural and international education were funded by the Rockefeller Foundation from 1983 to 1993. Financial support ranged from $250,000 to $1 million annually over a period of three years (Renyi, 1994). The **National Science Foundation** has supported many major initiatives in pre-college mathematics and science during that same period.

3. Other Philadelphia-area networks include Project 2061 created by the American Association for the Advancement of Science for the purpose of creating national benchmarks in science; the Brain and Behavior Network of middle and high school teachers organized through Bryn Mawr College; the Interactive Mathematics Project funded by the National Science Foundation and based at LaSalle College; a colloquium group studying "North Africa in its Mediterranean Context" (ongoing since 1985) organized through the Middle East Center at the University of Pennsylvania; a multi-year feminist scholarship colloquium series (Shapiro, Parssinen, and Brown, 1992); and a foreign language teacher study group. All of these groups received support from PATHS/PRISM at some point in their development. Another network is the Philadelphia Teachers Learning Collaborative, modeled on the work of Pat Carini at the Prospect School in Vermont.

4. The Philadelphia Alliance for the Teaching of Humanities (PATHS) was founded in 1984 by business and education leaders in Philadelphia. PATHS later merged with a similar non-profit organization, the Philadelphia Renaissance in Science and Mathematics (PRISM), in 1987. The combined organization focused its work on teacher professional development in the School District of Philadelphia. In 1995, PATHS/PRISM merged with the Philadelphia Schools Collaborative, an organization founded in 1988 with the support of The Pew Charitable Trusts to create smaller schools-within-schools (charters) in Philadelphia's 22 comprehensive high schools. The Collaborative has supported extensive teacher professional development efforts as well. The newly-merged organization, The Philadelphia Education Fund, is a member of the Public Education Fund Network in Washington, D.C., an organization linking the work of 58 public education funds in the U.S.

5. Math/Science Congress respondents are referred to as math teachers throughout this analysis since all but three taught math.

6. Of those Writing Project members returning the mailed survey, 58 percent of the respondents classified by a Director as "moderate to high involvement" members responded compared to 42 percent of those identified as "moderate to low involvement." When the responses of the five members who were interviewed are considered as well (all of whom were "high involvement"), two-thirds of the overall sample consisted of "moderate to high involvement members." More than three-fifths of the respondents in all four networks rated themselves as quite involved in their network. On a scale of 1-5, with 1 being "minimally involved" and 5 being "highly involved," the percentage reporting a "4" or "5" ranged from 60.6 among the math respondents, 65.4 of the SRLs, 72.7 of the Writing Project teachers, and 74.5 of the history project respondents. These percentages do not necessarily mean that the most involved members responded since high involvement is a defining characteristic of most networks.

7. The Women in World History Project is linked to the World History Project through its team members, advisers, and content themes. Another professional development initiative in world history, funded by the National Endowment for the Humanities (NEH) and directed by Professor Howard Spodek at Temple University, was also an outgrowth of the World History Project. More than a dozen participants from the World History Project and four from Women in World History are now involved in this new effort. Other participants, along with some of the members of the Women in World History project, attend an NEH-funded seminar series on Saudi Arabia which was begun in the last year at the Middle East Center at the University of Pennsylvania.

8. The other partners supporting Science Resource Leaders are Drexel University and the National Organization for the Advancement of Black Chemists and Chemical Engineers.

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